

REMARKS

The enclosed is responsive to the Examiner's Final Office Action mailed on December 1, 2009 and is being filed pursuant to a Request for Continued Examination (RCE) as provided under 37 CFR 1.114. At the time the Examiner mailed the Final Office Action claims 1-4, 6-8, 10-16, 18-22 and 24-34 were pending. By way of the present response the Applicants have: 1) amended no claims; 2) added no new claims; and 3) canceled no claims. As such, claims 1-4, 6-8, 10-16, 18-22 and 24-34 are now pending. The Applicants respectfully request reconsideration of the present application and the allowance of all claims now represented.

Claim Rejections

35 U.S.C. 103(a) Rejections

Claims 1-4, 6-8, 10-16, 18-22 and 24-34 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Cai et al., U.S. Patent No. 6,349,363 (hereinafter "Cai") and further in view of Gaither, U.S. Patent No. 6,223,256 (hereinafter "Gaither") and Vondran, Jr., U.S. Patent No. 6,243,791 (hereinafter "Vondran").

Cai discloses a system including multiple program execution entities and a cache memory having multiple sections. (Cai abstract) Additionally, Cai discloses a technique where the cache controller selects one of the P-caches based on a comparison of the EID provided by a request and the EID values stored in the storage elements. (Cai column 5, lines 56-59)

Gaither discloses a system including a plurality of processors each having dedicated cache memories, another level of cache shared by the plurality of caches, and a main memory. (Gaither abstract)

The combination does not describe what Applicants' claims require. With respect to claims 1 and 13, the combination does not describe:

partitioning a cache array into one or more special-purpose entries and one or more general-purpose entries, wherein special-purpose entries are only allocated for one or more streams having a particular stream ID and the stream ID is stored outside the cache array, wherein the special-purpose entries to use a first cache replacement algorithm and the one or more general-purpose entries to use a second cache replacement algorithm, wherein the first and second cache replacement algorithms are different;
determining if a cross-access scenario exists between at least one of the one or more special purpose entries and at least one of the one or more general purpose entries; and
if the cross-access scenario exists, permitting cross-access of data between the at least one of the one or more special-purpose entries and the at least one of the one or more general-purpose entries that relate to the cross-access scenario.

First, the combination does not describe "determining if a cross-access scenario exists between at least one of the one or more special purpose entries and at least one of the one or more general purpose entries." The Office Action points to two paragraphs of the present application's disclosure as the support for what a cross-access scenario is, Applicants do not concede that those are the only sections that describe a cross-action scenario or that the Office's interpretation is correct. For example, the Office Action seems to imply that "cross-action" involves a request not being serviced by either set, when that does not appear to be the case in the underlined sentence cited by the Office Action, but then seems to change that definition on the following page.

The Office Action asserts that Vondran describes this limitation. As support for this assertion the Office Action cites two sections of Vondran, however, neither of these sections describes this limitation. The first section is from the abstract and states that "[a]n address

value of a data access request from a CPU is compared to all cache sets within the cache regardless of the type of data and the type of data access indicated by the CPU to create a unitary interface to the memory hierarchy of the architecture.” This describes that there is never a determination of if a cross-access scenario exists as the address value is compared to all cache sets at all times. It’s merely describing that no matter what kind of request, all cache sets are checked to create a unitary interface to the heterogeneous cache. And while claims may be interpreted broadly per MPEP 2111, they do still have to be construed as one of ordinary skill in the art would interpret them. Under the Office Action’s interpretation, that most certainly is not the case because there is never any determination whatsoever. For example, Applicants respectfully request that the Office state exactly what happens after Vondran’s supposed determination is made. Does it change depending on the result of the supposed determination? Applicants respectfully submit that it will become clear that because there is no determination, then nothing happens as a result.

The second section recites “[s]ince data can have temporal and spatial access characteristics in different portions of processing, the same data may end up residing in several caches at the same time...” This statement relates generally to problems that may arise when dealing with multiple caches. Additionally, immediately following this quote Vondran describes how the prior art solves the data coherency issues. It does not relate to determining if a cross-access scenario exists as required by the claim.

Second, the combination does not describe “if the cross-access scenario exists, permitting cross-access of data between the at least one of the one or more special-purpose entries and the at least one of the one or more general-purpose entries that relate to the cross-access scenario.” The Office Action again asserts that the above two cites of Vondran

describe this limitation. However, as discussed above, Vondran does not describe determining if a cross-access scenario exists and thus does not do anything if one does. Moreover, in these two simplistic quotes, one describing the background issue and one from the abstract, could not possibly describe doing anything in response to a cross-action scenario (especially given that Vondran does not even describe determining if a cross-access scenario exists).

Accordingly, the combination does not describe what Applicant's claims 1 and require. Claims 2-4 and 6 are dependent on claim 1 and are allowable for at least the same reason. Claims 14-18 and 18 are dependent on claim 13 and are allowable for at least the same reason.

With respect to claim 7, the combination does not describe:

- a cache memory array partitioned into one or more special-purpose entries and one or more general-purpose entries, wherein special-purpose entries are only allocated for one or more streams having a particular stream ID, wherein the stream ID is stored outside the cache array;

- control logic to determine if a cross-access scenario exists between at least one of the one or more special purpose entries and at least one of the one or more general purpose entries, wherein the control logic comprises:

- special-purpose control logic to store data from the one or more streams in the one or more special-purpose entries when the particular stream ID and the particular input address match a predetermined stream ID and a predetermined input address, the special-purpose control logic to implement a first cache replacement algorithm for the one or more special-purpose entries, and

- general-purpose control logic to store data from the one or more streams in the one or more general-purpose entries when the particular stream ID and the particular input address do not match the predetermined stream ID and the predetermined input address, the general-purpose control logic to implement a second cache replacement algorithm for the one or more general-purpose entries, wherein the

first and second cache replacement algorithms are different; and
if the cross-access scenario exists, the control logic to permit cross-access of data between the at least one of the one or more special-purpose entries and the at least one of the one or more general-purpose entries that relate to the cross-access scenario.

First, the combination does not describe “control logic to determine if a cross-access scenario exists between at least one of the one or more special purpose entries and at least one of the one or more general purpose entries.” The Office Action asserts that Vondran describes this limitation. As discussed above, Vondran does not describe determining if such a scenario exists and rather describes the opposite of such as described above.

Second, the combination does not describe “if the cross-access scenario exists, the control logic to permit cross-access of data between the at least one of the one or more special-purpose entries and the at least one of the one or more general-purpose entries that relate to the cross-access scenario.” The Office Action again asserts that the above two cites of Vondran describe this limitation. However, as discussed above, Vondran does not describe determining if a cross-access scenario exists and thus does not do anything if one does.

Accordingly, the combination does not describe what Applicant’s claim 7 requires. Claims 8 and 10-12 are dependent on claim 7 and are allowable for at least the same reason.

Claims 19, 25 and 30 have similar limitations to 1, 7, and 13 are allowable for at least the same reasons. Claims 20-22 and 24 are dependent on claim 19 and are allowable for at least the same rationale. Claims 26-29 are dependent on claim 25 and are allowable for at

least the same rationale. Claims 31-34 are dependent on claim 30 and are allowable for at least the same rationale.

In light of the comments above, the Applicants respectfully request the allowance of all claims.

CONCLUSION

Applicant respectfully submits that all rejections have been overcome and that all pending claims are in condition for allowance.

If there are any additional charges, please charge them to our Deposit Account Number 02-2666. If a telephone conference would facilitate the prosecution of this application, the Examiner is invited to contact Dave Nicholson at (408) 720-8300.

Respectfully submitted,
BLAKELY, SOKOLOFF, TAYLOR & ZAFMAN LLP

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/David F. Nicholson/
David F. Nicholson
Reg. No.: 62,888

1279 Oakmead Parkway
Sunnyvale, CA 94085
(408) 720-8300